Cross Sectional View of a Topographic Feature

Part 6 in a Series
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The last article in our series (the Fall 2003 issue) explained features of topographic maps. If you now understand those principles you may be interested in converting that information into a side or cross sectional view. Most of you will be able to look at a topographic map and visualize what the terrain would look like as viewed from the side or the viewpoint of a traveler. Others may not. In either case, it may be interesting to plot the view for additional study.

The starting point is to take a topo map and draw a straight line between two points. See figure 1. Below that area, construct a graph that includes a scale to accommodate all elevations on your straight line.

To graph the side view of your line, draw a vertical line down from each point where your line intersects a contour line. Extend each line down to the appropriate line on the graph. Connect the dots and that will be a side or cross sectional view of the area along your line.

If you were traveling perpendicular to your line, you can now see the lowest areas or the easiest route of passage. This is a neat exercise but it is more practical to practice mentally visualizing the side view after interpreting the contour lines.

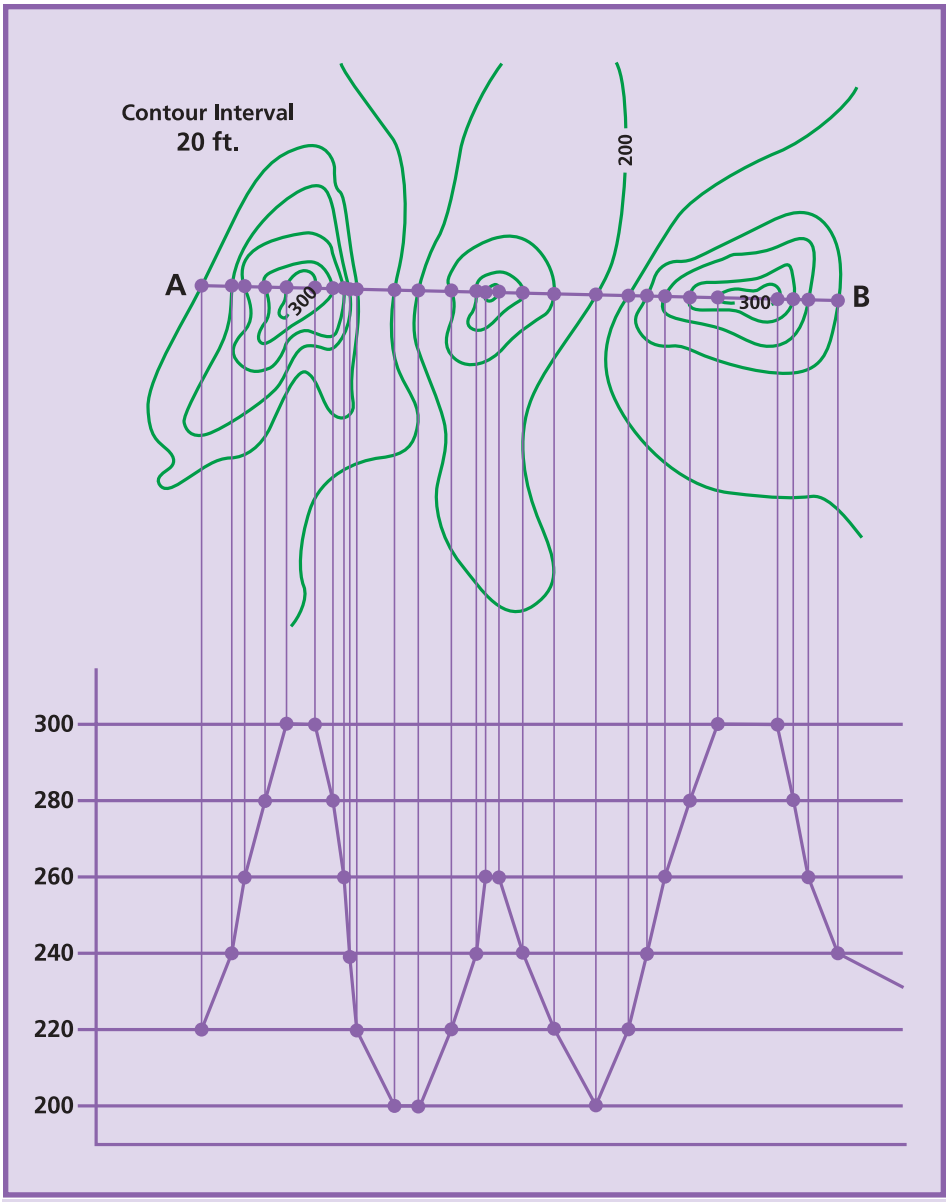

Figure 1 -- Cross Section of Line A-B

Map Distance vs. Ground Distance

Part 7 in a Series by ***Douglas A. Smith***
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Previous articles provided information about direction, distance, location, and topography. Another asset to utilizing your map knowledge is the understanding of the relationship between map distance to ground distance. This is a valuable tool for practical application.

Determine the scale of your map. It is often both explained in text and depicted as a graph bar. Take a ruler and measure the distance between two points on the map. Suppose the map scale was 1" =

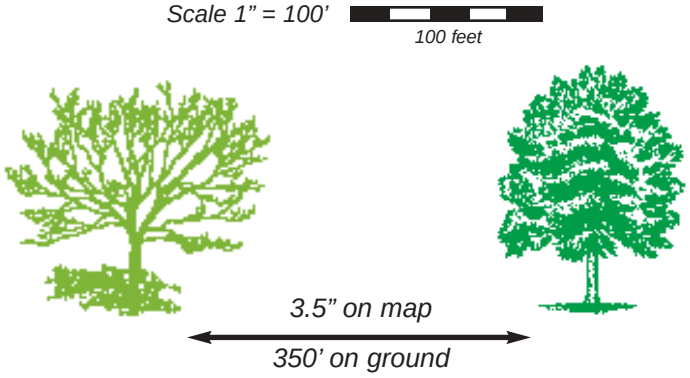
100'. This means that one inch on the map equals 100 feet on the ground. The distance you measured on the map was 3.5 inches. If each inch is 100 feet and you measure 3.5 inches then multiply the two (3.5 X 100 = 350) to determine the distance if you were actually on the ground. The distance between the two points would be 350 feet. Of course you can you apply the opposite approach if you measure ground distance and want to convert it to map distance. See Figure 1 at right.

Another type of scale is the RF or Representative Fraction. This type of scale is common on federal government topographic maps as well as aerial photographs. One example would be a scale of 1:25,000 which is common on topographic maps. This means that one unit on the map equals 25,000 units on the ground, or one inch on the map would equal 25,000 inches on the ground. Of course, 25,000 inches is equal to 2,083 feet (25,000"/12"=2,083'). The map distance on figure 2 would be 2 x 2,083' or 4,166'.

One foot on the map would equal 25,000 feet on the ground. Since the units are relative, the conversion process must start with both figures being the same unit. The answer can then be converted into any units desired by the user.

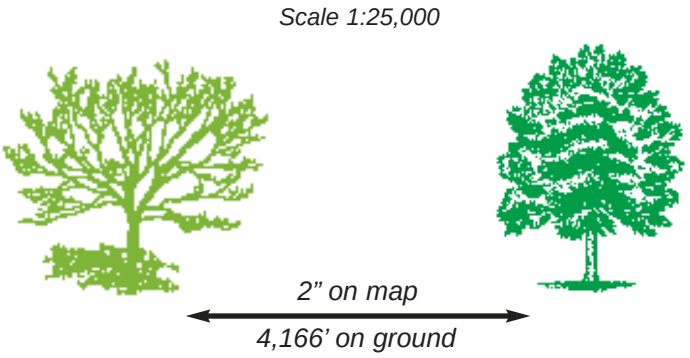
If you look at an aerial photograph from the Farm Services Agency (formerly the ASCS), it is likely to be 1:7920. This seems like an odd number but a computation produces information that is easy for you to understand and use. If 1"= 7,920", then divide 7,920" by 12"/foot and discover that 1" = 660 feet (10 ch) or 8" = (8 X 660) 5,280 feet or one mile. The 1:7920 scale is often called the "8 inches per mile" scale. It also computes to 1 square inch per acre. See figure 3.

Try working with scales and applying your knowledge in a variety of hypothetical and practical situations. This is a great exercise for youngsters who may not enjoy the normal classroom approach to mathematics.



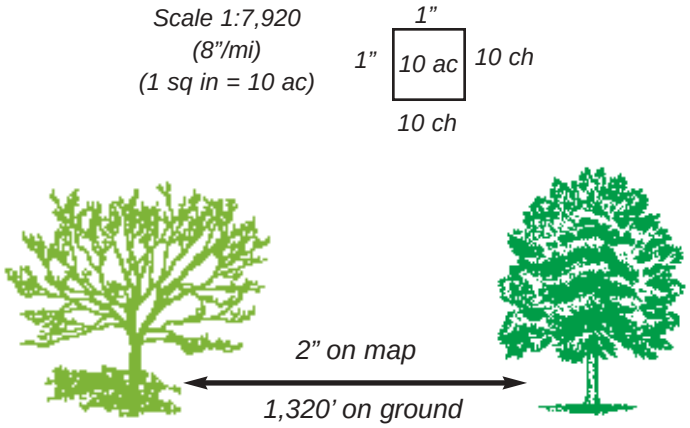
1" on the map = 100' on the ground
3.5" on the map = (3.5 x 100) 350' on the ground

Figure 1



1:25,000 > 1" = 25,000"
25,000"/12" = 2,083'
2,083' x 2" = 4,166 feet on the map

Figure 2



1:7,920 can equate to 1" = 7,920"
2 x 7,920" = 15,840"
15,840" / 12" = 1,320'

If 2" = 1,320' then 1" = 660' or 10 chains
If 1" = 660' then 8" = 5,280' (8 x 660 = 5,280) ***Therefore 1" = 1 Mile***

If 1" = 660' then 1" = 10 ch (660'/66' per ch)
(1" x 1" is 10 ch x 10 ch or 100 sq ch) > 100 sq ch/10 sq ch per ac = 10 acres
This is a convenient scale that was discussed in a previous article.

Figure 3